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IS 8368 (2010): Tungsten Carbide Powder for Hardmetals [MTD  
25: Powder Metallurgical Materials and Products]

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भारतीय मानक  
कठोर धातुओं के लिए टंगस्टन कार्बाइड पाउडर — विशिष्टि  
( दूसरा पुनरीक्षण )

*Indian Standard*  
TUNGSTEN CARBIDE POWDER FOR  
HARDMETALS — SPECIFICATION  
( *Second Revision* )

ICS 77.160

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**BUREAU OF INDIAN STANDARDS**  
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NEW DELHI 110002

## FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Powder Metallurgical Materials and Products Sectional Committee had been approved by the Metallurgical Engineering Division Council.

This standard was first published in 1977 and subsequently revised in 1985. In this revision following modifications have been made:

- a) A new clause giving latest reference has been incorporated,
- b) Reference to terminology and method of chemical analysis has been added, and
- c) Requirements of test certificate has been added.

Tungsten carbide powder is used in the manufacture of hardmetals, which find applications in cutting tool tips, rock drilling bits, wear part and dies.

This standard contain clauses **5.3** and **6** which call for agreement between the purchaser and the manufacturer.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated expressing the results of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

## Indian Standard

# TUNGSTEN CARBIDE POWDER FOR HARDMETALS — SPECIFICATION

*( Second Revision )*

## 1 SCOPE

This standard specifies the requirements of tungsten carbide powder used for the manufacture of hardmetals.

## 2 REFERENCES

The following Indian Standards contain provisions, which through reference in this text, constitute provisions of this standard. At the time of the publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

<i>IS No.</i>	<i>Title</i>	<i>IS No.</i>	<i>Title</i>
1387 : 1993	General requirements for the supply of metallurgical materials ( <i>second revision</i> )	(Part 6) : 1988	Determination of chromium in contents from 0.01 to 2 percent (m/m)
5432 : 1982	Glossary of terms relating to powder metallurgy ( <i>first revision</i> )	12539 : 1988	Determination of total carbon in hardmetals by gravimetric method
6492 : 1972	Methods for sampling of powders for powder metallurgical purposes	12548 : 1988	Determination of insoluble (free) carbon in hardmetals by gravimetric method
7512 : 2006	Method for the determination of average particle size of metal powders by Fisher sub-sieve sizer ( <i>first revision</i> )		
12473	Chemical analysis of hardmetals by flame atomic absorption spectrometry:		
(Part 1) : 1988	General requirements	i)	Aluminium 0.003, <i>Max</i>
(Part 2) : 1988	Determination of calcium, potassium, magnesium and sodium in contents from 0.001 to 0.02 percent (m/m)	ii)	Calcium 0.005, <i>Max</i>
(Part 3) : 1988	Determination of cobalt, iron manganese and nickel in contents from 0.01 to 0.5 percent (m/m)	iii)	Carbon (total) 6.1, <i>Min</i>
(Part 4) : 1988	Determination of molybdenum, titanium and vanadium in contents from 0.01 to 0.5 percent (m/m)	iv)	Carbon (free) 0.1, <i>Max</i>
(Part 5) : 1988	Determination of cobalt, iron, manganese, molybdenum, nickel, titanium and vanadium in contents from 0.5 to 2 percent (m/m)	v)	Chromium 0.01, <i>Max</i>
		vi)	Cobalt 0.05, <i>Max</i>
		vii)	Copper 0.01, <i>Max</i>
		viii)	Iron 0.05, <i>Max</i>
		ix)	Molybdenum 0.1, <i>Max</i>
		x)	Nickel 0.01, <i>Max</i>
		xi)	Oxygen 0.08, <i>Max</i>
		xii)	Silicon 0.005, <i>Max</i>
		xiii)	Sodium+Potassium 0.002, <i>Max</i>
		xiv)	Sulphur 0.002, <i>Max</i>
		xv)	Phosphorous 0.1, <i>Max</i>
		xvi)	Tungsten Balance

## 3 TERMINOLOGY

For the purpose of this standard, definitions as given in IS 5432 shall apply.

## 4 SUPPLY OF MATERIAL

General requirements relating to the supply of tungsten carbide powder shall be as laid down in IS 1387.

## 5 CHEMICAL COMPOSITION

**5.1** Chemical composition of tungsten carbide powder shall be as given in Table 1.

**Table 1 Chemical Composition of Tungsten Carbide Powder**

SI No. (1)	Constituent (2)	Percent (3)
i)	Aluminium	0.003, <i>Max</i>
ii)	Calcium	0.005, <i>Max</i>
iii)	Carbon (total)	6.1, <i>Min</i>
iv)	Carbon (free)	0.1, <i>Max</i>
v)	Chromium	0.01, <i>Max</i>
vi)	Cobalt	0.05, <i>Max</i>
vii)	Copper	0.01, <i>Max</i>
viii)	Iron	0.05, <i>Max</i>
ix)	Molybdenum	0.1, <i>Max</i>
x)	Nickel	0.01, <i>Max</i>
xi)	Oxygen	0.08, <i>Max</i>
xii)	Silicon	0.005, <i>Max</i>
xiii)	Sodium+Potassium	0.002, <i>Max</i>
xiv)	Sulphur	0.002, <i>Max</i>
xv)	Phosphorous	0.1, <i>Max</i>
xvi)	Tungsten	Balance

**5.2** The chemical composition of tungsten carbide powder shall be done by the method specified in IS 12473 (Parts 1 to 6), IS 12539 and IS 12548 or any other established instrument/chemical method as agreed to between the purchaser and the manufacturer.

**5.3** The method of chemical analysis of elements in tungsten carbide powder, if Indian Standard not available, shall be agreed to between the purchaser and the manufacturer.

## 6 AVERAGE PARTICLE SIZE

The average particle size of tungsten carbide powder shall be determined in accordance with IS 7512. The particle size shall be as agreed to between the purchaser and the manufacturer.

## 7 SAMPLING

The sampling of powder for conducting chemical analysis and particle size determination shall be done in accordance with IS 6492.

## 8 PACKING

The powder shall be supplied, packed in suitable containers in quantity mutually agreed to between the purchaser and the manufacturer.

## 9 MARKING

**9.1** Each container of tungsten carbide powder shall be marked with the following information:

- a) Tungsten carbide powder;
- b) Average particle size;
- c) Batch number and/or date of manufacture of powder;
- d) Net mass of powder in the container; and
- e) Manufacturer's name and address.

## 9.2 BIS Certification Marking

Each container of the tungsten carbide powder may also be marked with the Standard Mark.

**9.2.1** The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of the Standard Mark may be granted to manufacturers or producers, may be obtained from the Bureau of Indian Standards.

## 10 TEST CERTIFICATE

If required, a test certificate may be supplied with a consignment of tungsten carbide powder indicating details of batch number, chemical composition and average particle size.

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